AMENDMENTS TO THE CLAIMS

1 - 53. (Canceled)

54. (Currently amended) A cooling mechanism ~~according to claim 53 wherein~~ for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical valve element to a position in which the ports are aligned, the cooling mechanism comprising at least one passage formed in the rotary valve cylinder through which, in use, cooling fluid flows, wherein the rotary valve cylinder comprises a circular top surface which closes one end of the rotary valve cylinder to define a combustion chamber between the underside of the top surface and the top of a piston located inside the rotary valve cylinder, the cooling fluid being forced over the circular top surface of the rotary valve cylinder to cool the circular top surface of the rotary valve cylinder, and the rotary valve cylinder comprises a cylindrical cylinder wall in which the fluid cooling passage is formed.

55. (Currently amended) A cooling mechanism according to claim ~~53 or~~ 54, wherein the fluid cooling passage in the rotary cylinder wall extends substantially along the length of the rotary cylinder wall.

56. (Currently amended) A cooling mechanism according to claim ~~53~~ 54, wherein the fluid cooling passage extends in a direction substantially parallel to the rotational axis of the rotary valve cylinder.

57. (Currently amended) A cooling mechanism according to claim ~~53~~ 54, wherein the rotary valve cylinder is formed with a plurality of fluid cooling passages.

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58. (Currently amended) A cooling mechanism according to claim ~~53~~ <u>54</u>, wherein the fluid cooling passages, when viewed in the direction of the axis of rotation of the rotary valve cylinder, extend substantially around the circumference of the rotary valve cylinder wall.

59. (Previously presented) A cooling mechanism according to claim 57 or 58, wherein the fluid cooling passages in the rotary cylinder are substantially equispaced around the circumference of the rotary cylinder.

60. (Currently amended) A cooling mechanism according to claim ~~53~~ <u>54</u>, wherein the fluid cooling passage or passages are defined between an inner cylinder which is received within an outer cylinder to together define the rotary valve cylinder, at least one of the inner or outer cylinders being formed with a groove or grooves which define(s) the oil cooling passage or passages.

61. (Currently amended) A cooling mechanism according to claim ~~53~~ <u>54</u>, wherein the fluid flow path includes passageways formed within the outer cylindrical valve element.

62. (Currently amended) A cooling mechanism ~~according to claim 53,~~ <u>for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical valve element to a position in which the ports are aligned, the cooling mechanism comprising at least one passage formed in the rotary valve cylinder through which, in use, cooling fluid flows,</u> wherein the rotary valve cylinder comprises a circular top surface which closes one end of the rotary valve cylinder to define a combustion chamber between the underside of the top surface and the top of a piston located inside the rotary valve cylinder, the

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cooling fluid being forced over the circular top surface of the rotary valve cylinder to cool the circular top surface of the rotary valve cylinder.

63. (Previously presented) A cooling mechanism according to claim 62, wherein an upper part of the rotary valve cylinder is formed with at least one channel or channels around the periphery of the circular top surface through which, in use, the cooling fluid flows.

64. (Previously presented) A cooling mechanism according to claim 62, wherein an upper fluid cooling chamber is formed adjacent the circular top surface of the rotary valve cylinder.

65. (Previously presented) A cooling mechanism according to claim 64, wherein the fluid cooling passage or passages in the wall of the rotary valve cylinder communicate with the upper fluid cooling chamber via the channel or channels formed in the upper part of the rotary valve cylinder.

66. (Previously presented) A cooling mechanism according to claim 64, wherein the fluid cooling passage or passages in the wall of the rotary valve cylinder communicate with the upper fluid cooling chamber at the periphery of the upper fluid cooling chamber.

67. (Currently amended) A cooling mechanism according to claim ~~53~~ 54, wherein, in use, the cooling fluid enters the rotary cylinder at an upper end of the rotary valve cylinder at a position adjacent the top surface of the rotary valve cylinder.

68. (Currently amended) A cooling mechanism according to claim ~~53~~ 54, wherein the cooling fluid exits from a lower end of the rotary valve cylinder at a position distal from the circular top surface of the rotary valve cylinder.

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69. (Previously presented) A cooling mechanism according to claim 63, wherein the fluid enters the rotary valve cylinder at a feed point at the top surface of the rotary valve cylinder, a fluid seal being provided immediately below the fluid feed point, the fluid seal, in use, resisting any fluid flow from the fluid feed point into the region of the valve port of the rotary valve cylinder.

70. (Previously presented) A cooling mechanism according to claim 69, wherein the fluid enters the top surface of the rotary valve cylinder through a channel formed in a boss that is of smaller diameter than the outer diameter of the rotary valve cylinder.

71. (Previously presented) A cooling mechanism according to claim 70, wherein the upper fluid cooling chamber is positioned between the boss and the top surface of the rotary valve cylinder so that the fluid flows down through the channel formed in the boss so as to flow within the inner diameter of the fluid seal, and into the upper fluid cooling chamber.

72. (Previously presented) A cooling mechanism according to according to claim 64, wherein the upper fluid cooling chamber is formed by a substantially hollow plug at the top surface of the rotary valve cylinder, the periphery of the plug being sealed against the periphery of the top surface of the rotary valve cylinder, the fluid cooling chamber being defined between the walls and ceiling of the plug and the top surface of the rotary valve cylinder.

73. (Previously presented) A cooling mechanism according to claim 64, wherein, in use, the fluid flows through the upper fluid cooling chamber so as to directly contact the top surface of the rotary valve cylinder to provide direct cooling of the top surface of the rotary valve cylinder, which in turn cools the combustion chamber roof.

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74. (Currently amended) A cooling mechanism ~~according to claim 53,~~ for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical valve element to a position in which the ports are aligned, the cooling mechanism comprising at least one passage formed in the rotary valve cylinder through which, in use, cooling fluid flows, wherein the rotary valve cylinder comprises a circular top surface which closes one end of the rotary valve cylinder to define a combustion chamber between the underside of the top surface and the top of a piston located inside the rotary valve cylinder, the cooling fluid being forced over the circular top surface of the rotary valve cylinder to cool the circular top surface of the rotary valve cylinder, wherein the outer cylindrical valve element is provided with cooling means operative to transfer thermal energy from the fluid to the outer cylindrical valve element and into the air surrounding the second cylindrical valve element.

75. (Previously presented) A cooling mechanism according to claim 74, wherein the cooling means comprises at least one fin extending outwardly from the outer cylindrical valve element.

76. (Previously presented) A cooling mechanism according to claim 75, wherein the cooling means comprises a plurality of fins that are relatively spaced around at least part of the outer cylindrical valve element.

77. (Currently amended) A cooling mechanism according to ~~claims~~ claim 74, wherein the fluid flow path includes passageways formed within the outer cylindrical valve element[[., are]] adjacent the cooling means to maximize the transfer of thermal energy from the

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fluid to the outer cylindrical valve element and to the air surrounding the outer cylindrical valve element.

78. (Previously presented) A cooling mechanism according to claim 77, wherein the fluid passageways formed in the outer cylindrical valve element are substantially equispaced around the outer cylindrical valve element.

79. (Previously presented) A cooling mechanism according to claim ~~53~~ 54, wherein the outer cylindrical valve element is provided with cooling means operative to transfer thermal energy from the fluid to a liquid cooling medium contained in a jacket formed in the outer cylindrical valve element.

80. (Previously presented) A cooling mechanism according to claim 79, wherein the jacket is adjacent the fluid passageways formed in the outer cylindrical valve element.

81. (Previously presented) A cooling mechanism according to claim 79 or 80, wherein the liquid cooling medium is a water based cooling medium.

82. (Currently amended) A cooling mechanism according to claim ~~53~~ 54, wherein the fluid cooling medium is oil.

83. (Previously presented) A cooling mechanism according to claim 82, wherein the oil is the engine lubrication oil.

84. (Previously presented) A cooling mechanism for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical

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valve element to a position in which the ports are aligned, the cooling mechanism comprising a heat sink mounted directly to an upper part of the rotary valve cylinder so as to rotate with the rotary valve cylinder, the heat sink being otherwise exposed to the open air.

85. (Previously presented) A cooling mechanism according to claim 84, wherein the heat sink comprises a separate component mounted directly to the top of the rotary valve cylinder.

86. (Previously presented) A cooling mechanism according to claim 84, wherein the heat sink is formed integrally with the rotary valve cylinder so that the heat sink and rotary valve cylinder together comprise a single component.

87. (Previously presented) A cooling mechanism according to according to claim 84, wherein the upper part of the rotary valve cylinder comprises a circular top surface below which is provided a combustion chamber.

88. (Currently amended) A cooling mechanism according to claim 87, wherein, to maximize the heat transferred to the heat sink, the diameter of the part of the circular top surface of the rotary valve cylinder to which the heat sink is attached is at least 50% of the external diameter of the rotary valve cylinder.

89. (Previously presented) A cooling mechanism according to claim 87 or 88, wherein the base of the heat sink is at least 50% of the external diameter of the rotary valve cylinder.

90. (Currently amended) A cooling mechanism according to claim 88, wherein, to maximize the heat transferred to the heat sink, the diameter of the part of the top surface of the

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rotary valve cylinder to which the heat sink is attached is at least 75% of the external diameter of the rotary valve cylinder.

91. (Previously presented) A cooling mechanism according to claim 84, wherein the rotary valve cylinder is mounted on the outer cylindrical valve element by bearing means, the bearing means being positioned distal from the upper part of the rotary valve cylinder so that the valve port formed in the rotary valve cylinder is between the upper part and the bearing means.

92. (Previously presented) A cooling mechanism according to claim 91, wherein the bearing means comprises two relatively spaced bearings.

93. (Currently amended) A cooling mechanism according to claim 92, wherein one of the two bearings is located below but adjacent the valve port of the rotary valve cylinder, whilst the other bearing is located at a lower part of the rotary valve cylinder distal from the valve port of the rotary valve cylinder.

94. (Previously presented) A cooling mechanism for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical valve element to a position in which the ports are aligned, the cooling mechanism comprising thermal insulation means at an inner surface of the valve port formed on the outer cylindrical valve element, the thermal insulation means being operative to minimize the thermal energy transferred between the outer cylindrical valve element and any gas flowing through the port.

95. (Previously presented) A cooling mechanism according to claim 94, wherein the valve port formed in the second cylindrical valve element comprises an inner surface, the

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thermal insulation means substantially covering the inner surface such that the gas flows against the thermal insulation means.

96. (Previously presented) A cooling mechanism according to claim 94 or 95, wherein the inner surface of the valve port is of rectangular transverse cross section when viewed along the longitudinal axis of the valve port.

97. (Previously presented) A cooling mechanism according to claim 94, wherein a manifold is provided to convey gas to or from the valve port in the outer cylindrical valve element, the thermal insulation means comprising a protrusion on the inlet manifold which protrudes into the valve port towards the rotary valve cylinder.

98. (Previously presented) A cooling mechanism according to claim 97, wherein the protrusion extends into the valve port towards the rotary valve cylinder so as to be adjacent but not in contact with the rotary valve cylinder.

99. (Previously presented) A cooling mechanism according claim 97 or 98, wherein the protrusion is spaced from the inner surface of the valve port so that a small air gap is provided between the radially outer surface of the protrusion and the inner surface of the inlet port, the air providing further thermal insulation between fit gas and the outer cylindrical valve element.

100. (Previously presented) A cooling mechanism according to claim 97, wherein the manifold is mounted on the outer cylindrical valve element by mounting means formed from a thermally insulating material.

101. (Previously presented) A cooling mechanism according to claim 97, wherein the thermal insulation means is formed from a separate tubular component made from a thermally insulating material, said tubular component being adapted to be received in the valve port so as to substantially cover the inner surface of the valve port.

102. (Previously presented) A cooling mechanism according to claim 101, wherein the outer cylindrical valve element is formed with an inlet valve port and an exhaust valve port, thermal insulation means being provided on both ports so as to reduce heat transfer from the outer cylindrical valve element to the inlet gas through the inlet valve port, and to reduce heat transfer from the exhaust gas to the outer cylindrical valve element through the exhaust port.

103. (Previously presented) A cooling mechanism for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical valve element to a position in which the ports are aligned, the cooling mechanism comprising at least one passage formed in the rotary valve cylinder through which, in use, cooling fluid flows, the cooling mechanism further comprising thermal insulation means at an inner surface of the valve port formed on the outer cylindrical valve element, the thermal insulation means being operative to minimize the thermal energy transferred between the outer cylindrical valve element and any gas flowing through the port.

104. (Previously presented) A cooling mechanism for a rotary valve cylinder engine comprising a rotary valve cylinder rotatably mounted within an outer cylindrical valve element, the rotary valve cylinder and the outer cylindrical valve element each being formed with a respective valve port, the rotary valve cylinder being rotatable relative to the outer cylindrical

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valve element to a position in which the ports are aligned, the cooling mechanism comprising a heat sink mounted directly to an upper part of the rotary valve cylinder so as to rotate with the rotary valve cylinder, the heat sink being otherwise exposed to the open air, the cooling mechanism further comprising thermal insulation means at an inner surface of the valve port formed on the outer cylindrical valve element, the thermal insulation means being operative to minimize the thermal energy transferred between the outer cylindrical valve element and any gas flowing through the port.

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